

Linkage of H₁ - H₂ - F/9, ...

1051

5/22/53.

A	SW666 x SW1049 c	1/Plates	no swarms	w.h. 5/27 6/9
B	"	" 1/tubes	$\frac{1}{2} : \frac{1}{2}$	- = P.A
C	"	" 1/2 Plates	$\frac{3}{3}$	$\frac{16(1L-4C) + 1,2}{10++}$
D	"	" 1/tubes	$\frac{1}{2} = \frac{1,2}{4++}$	$\frac{3++}{4++}$, dxx; b.
E	SW967 x SW1049	1/tubes	SW1031 a:b	$\frac{1}{2} =$ sgm 3(gm) a.w.k. dewum?
F	" x 1/2	1/tubes	SW1031 a:b	$\frac{1}{2} =$ 1/2xx 1.0.
G	SW1053 a:c x 15C (abony em)	abc	$\frac{1}{2} : \frac{1}{3}$	enx
H	" c:a x 15C	"	$\frac{1}{2}$	self below
I	HO \rightarrow 1/bs + 1/bc enx swarms	"	$\frac{1}{3}$	swarms
K	SW1053 a \rightarrow 666		1/6	5/26 6/5
L	" a \rightarrow 967	plates 1sw, gm \rightarrow pm	pm	c
M	" c \rightarrow 666		1/6	c \rightarrow b?
N	" c \rightarrow 967	plates 1sw, gm \rightarrow pm	1pm	Rev. not.

Note: in above experiments, SW967 survivorships (and descendants) were very low. SW666 x yields one or few swarms / plate (.1ml)

		isolates	a	b	5/24	c	d
G-H.	G	1	enx	a	enx/a enx	a/a	a/enx.a
		2	enx	a	w.h. enx	: enx	c? not.
		3	enx	a	image maggots (softened) 18h \rightarrow magg.	enx	image
H	H	1	enx	c	enx/c enx	c/c	c/c enx
		2	enx	c	enx	enx	c (w.h.)
		3	enx	c	magg	enx	enx
					magg \rightarrow mag.	enx	no thorax

have some maggotable derivatives.

No evidence of a:c (:enx) variation.

Perhaps 1053 insufficiently variable to start. Review H₁:H₂ available

Re-std after not; s.c.i.

(om)

Q SW1054 (Kroffate) env → TM2
 1. ph' stilli
 2. ph' env:
 R " 1055 " " → 1. ph' stilli
 2. ph' C: 1,2

SW105

After re-motility test (second passage)

Q2 still env++, immobile in env screens.

However, reacts slowly + lightly in i, not b, n1,2

Compare SW986. (Edwards calls this i-env)

1041-7

1041-7 (abng → T07 env:i) moved overnight through env
- invisible !! smut? 0.2

WILDFLOWERS					
SPECIMENS					
1051C 1051M					
1	21	1	12	24	
2	23	2	13	25	
6		3	15	26	
9	26	4	16	27	
11	30	6	17	28	
12	32	7	19		
	1051K				
16		8	20		
18	2	9	21		
19	3	10	22		
20	4	11	23		
	5				

6/18/53.

Q, SW1051 env → SW1046 /i:1,2 3 tubes
 R 1055 " "

Q3. (4,5 no swarms) → still i:1,2.

R3 (" ") → env or tough. S.O. finds ^{strong and persistent}
 T.O. others (no swarms) 6/26.

Q2 repeated had not swarmed in > 1 week. T.O.

env ++ i ++ a - c-. Remotely and pass through
 env, i ...

single (dans i; env esp. Chilean brother from these).

Thus SW1055 is (at least) $H_1^c H_2^{env}$ and SW1051 is confirmed tentatively
 as $(H, a) H_2^{env}$

Rechecked: R3 P.C. (keyslide aggl.)

R3	i	env	b	-
.	++	-		
.	+	++		
Q2 mat	++	+++		
stah	++	+++		

∴ confusion of phases may
 again be involved. (cf 6/26)

R3, more rapidly through i, largely blocked in env. T.O. in
 view of evidence of mixture. env serum may contain secondary
 agglutinins: wait for shipment of Minnesota serum

of SW1061!

5/30/53

1042

Received from Adinolfi + Moran: c. 24 hours swarming: + = 1cm and density

P.R.E. A W H₂ Vacc. 147
B Peru 818 ← SW 1058
C " 837
D " 830

++
+
±
±

+ = 1cm

A.M.

E 1967
F 1255
G 715B
H Petros 7-404
I Thermo
J McCarren
K 1966
L M1
M 1966
N Cee
O Schofield
P 763B
Q C
R B2
S Peru 2

++
+ +
+ ±
+ +
++ +
+ +
++ +
+ +
+ +
+ +
+ +
+ +
+ +
+ +
+ +
+ +

avg: b w. not ab-eggs
" " "

also
have

T W H1 Rough
U Platt
V PM 764R
W D7 Rough
X D " "
Y Borstemi 556 "

∴ choose among A, E, K, M. Melt off and remount; shake out.

For second run:

Hoffmeyer

B +
E ++
K +
M ++

"Smoothness"
Edmonson NA

±
±
+
++

14/cr Not

+

Aggl. (excr)
++

++
++
++
++
=

↔ dub?
b ✓

(726 A.M.)

N - myxoblasts { microscopically almost immobile
O - " " { (occasional spines)

sic.

Use M particularly. s.c. after melt = SW 1056

22 - X O dense play swarms; eat off: immobile
(not trails seen initially)

→ still slow after 24-36 hours

Fixon
(over)

N and O are essentially
O-forms! but why do not
occ. motile cells swarm?
Temp?

PA22 x 0 20 swarms: all evx

No swarms on controls (2 plates, 48 hours)
Purify $\frac{1}{4}$ for agglutinity test. \rightarrow absolutely membrane
to 6/9/53.

N gave one late, very rough, slow swarm apart
+ PA22 \rightarrow 10.

M taken as SW1056 for later study.

However, in evx serum \rightarrow \perp ! Repeat with
single colony resolution! (and purify somatic antigen)
 \in PRE

In recheck, of Edwards' cultures, B = Penn 818
sewed best. After motility test, use as SW1058

SW1056b in b serum 1. \rightarrow - , late rough
2 \rightarrow ≥ 33 .

\therefore evx \rightarrow b: -

Resumé. 6/10/53.

Tva. (N97)

1. 1046 various single colony isolates for consistency in extent of variation: of B1-B3.

But s.c.i from B1, B2 (which had zone b:1,2:- and b:1,2;b:- respectively) \rightarrow 1,2 all :- (1? b233).

46 FG. Some magnetizable phases. B2-1 is only example of b:1,2:b in this series.

of 1046B1 = SW1043 and SW1007; former is b:1,2:(-) latter is b:-

Suggests possibility of "interconversion" of variability.

46C : FA 22 \rightarrow SW1043 \rightarrow 2 : i : 1,2 : - SW1049

DE SW1031 b \rightarrow TM1046 \rightarrow 2 cases $\begin{cases} b:1,2:b \\ b:1,2:b \end{cases}$ *not tested further*

a \rightarrow " $\begin{cases} a:1,2:a \\ a:1,2:a \end{cases}$

\therefore SW1031 is interpreted as H.^aH.^b

JK. Frictional or homology test

J. abony² \rightarrow SW1049 (H₁ⁱH₂⁻H₃^{1,2}) $\xleftarrow{2}$ b:1,2 *not test*

1046 K " $\xrightarrow{\text{sw}}$ 1043B2.2 (H₁^bH₂^{1,2}) \longrightarrow KL enx:1,2:enx

\therefore 1,2
not tested in 1,2:enx

1049

H, sc. tests on S. wein; der-es-schem; delineates mechanism.

A-B FA3 (altendo/c) \rightarrow SW1031 a:b

SW1052 c:b: not test.

SW1053 c:a:st

49 G abmy ^{enx} \rightarrow SW1049 /i;b;1,2 ($H_1^i H_1^{1,2} H_2^-$) \rightarrow $H_1^{1,2} H_2^{enx}$
see 465

5 isolates enx:1,2:enx

Either phase in 1,2+enx \rightarrow either enx, or maggot.
Some are still being rechecked for i. $enx:c:enx$ SW 1054

1 51.G-H. abmy ^{enx} \rightarrow SW. 1054-3 \rightarrow T1-3
 \rightarrow H1-3 SW
 $enx:a:enx$ 1055

Efforts to demonstrate c:a:enx, a:c:enx resp.
in C+enx, a+enx have given nonagglutinable forms. cf. 49G.

Q SW1054 \rightarrow TM2 ph2 \rightarrow enx: monophasic!

1055 \rightarrow \rightarrow c:1,2
(c:enx)

\therefore While H, H_1 , structure of java seems to be justified by SW1052-3 (c:b c:a), the final proof of a trichosis is not settled. Homologies of (enx \rightarrow H, H₁) \rightarrow still to be settled. (Q-R large scale).

(over)

A more readily variable example of H, H, would be desirable.
(SW1031 is perhaps the most distinctive).

Tests 1050 perhaps should be repeated. Try on a:enx.

lineage H₁-H₂ → P/a₁

1051 Tests very limited : Total actually only 5.

SW1049 (i:1,2 H₁, H₁,²) → SW666. 2 i: -

ph1,2 → : b: 26 1,2: 7

SW1031 → SW967
1053 → SW967) note: very long gills +
apparent lysis why?

1053 → SW666 a: - q: -

1053c → " e: -

abteri-egii and paratyphi A.

1052. Screening of Moranstrains leaves doubts on several of these concerning identity, as some are mix: b. D E (1967 - relation to 1966) not yet tested.

Fix m 1052B (Edwards) as authentic strain.

1045. Several attempts $\rightarrow \alpha^-$ unsuccessful.

However, SW1048 seems more transducible (fr F/ α^+) by FA(PB), though not by TM.

Note: F.R. records SW1048 as I-, 948 as I+.

(104531) SW1047 as I+ SW694 as I-
Transduction?

Perhaps should check other transductions \rightarrow 1048 for restoration of I.

6/3/53 (y EYL)

W2281X H245

40 colonies plated out, ~~replicate~~ to pick 1 apparent Gal^v to EM5

Gal. Replicate to EMB Gal, Lac, Mal, MH.

Pick 3 as most likely still Mal^v, Lac^v.

(of original 40, all were Lac+ (v) exc. 2, 8, 32, 40.

	Lac	Mal	MH	Gal	
4	v	+	v	v	
7	v	v	v	v	
14	v	-, v	v	v	
23	-, v	v	v	?, -	
27	v (+/-)	+,-?	+	+, -?	
28	v	v	v	v	
29	v	v	v	v	
39	-, v	+	+	+	

} not - . not Gal^v.

14, 23, 27 must be ~~replated~~ rev to verify whether Gal^v or Gal⁺
 (latter is assumed Gal⁺ or +, modified by other segregations)

Esther later isolated H 324 from this cross. T.O.

This material

Compatibility Tests of W2284

1055

6/6/53.

by PDS - W2284 from W1895 / motility passage.

In his hands, F- and not re-infected by W1817 or by W1895.
(however, controls not tested).

- W2284, W1802 grown with W1305 3 hours. Mixture (F) then strained out (\rightarrow F1) and plated directly with W677, W1896:

		D/L	EMBac
1	W1802 x W677	-	-
2	W1802 1896	++	++ \rightarrow -
3	1802F 677	2	3 -
4	" 1896	+	
5	2284 x 677	-	-
6	" 1896	++	++ \rightarrow -
7	2284F 677	\pm	$\frac{+}{-}$ $\rightarrow +$
8	" 1896	+	
9	W-6 677	+	+ \rightarrow +
10	" 1896	+	

This mixture of W2284 (or W1802) with W1305 is clearly F+

- Isolate Lact from initial mixtures with W1305. (ca 10-20 colonies from EMBac pooled in broth & read after incubation overnight).

W1802' x 677	+
W2284' x 677	+

Re streak on EMB.
2284F1 - 2 pure Lact
1802F1 - 2 some? mixed.

- Lact from mixture overnight. Pool incubated 4-6 hours.

1802' x 677	+
2284' x 677	+

May have same
Lac -
Re-purify and
check single colonies
of 2284F2

(own)

55A W2284 + W1941 in broth overnight.
 S.O. EM Blac ca = Dissolve, test, rep. Lact +
 sterile x W677

B. As W1802. Came out ca 100:1 - : +, rep. Lact + and
 test as above.

Repeat 2284... F x 1956 Repurified (pool still)

1802 x 1956	—
1802F1	++
1802F2	+++
2284F1	-

2284F2 " + (few)

may be either sterile or
 motile

Try passing back to W677.

2284 x prot. test as Hfr. F⁻ ...
 *
 2057 4 Malt
 6/10/53 3 Malt test by S.O.

On test 6/14/53

2284F2 pool	—
S.C. 1	-
S.C. 2	-
S.C. 3	-
w6	++

w677 w1896 ++ ∵ pool has
 become F⁻!
 Test for transfer to
 W677!

6/19/53...

W2284" F2" + W1958 overg. it, S.O. in EMS lac run to recover

H. "exposed" 1958 as lac + sh. Mor pool to lysisay.

I. (W2284F2 + W1305) x W1958 10 prototyphos
2284F2 " "

∴ 2284F2 does not become grossly
infactory after losing F+ quality.

JK J (W2061 (MTL-Hfr) + W1958) x W1802 40 prototyphos

K. (W1305 MTL-Hfr + W1958) x " 80 "

J. Transfer from Hfr? Temporary or mutable? or recombination.
Lac⁺ V^R Mal⁺ S^S Lac⁻ V^R Mal⁻ × Lac⁺...
no other markers at hand.

Reprint: (W2061 + W1607)
Lac⁺ S^S (Lac⁻ Gal⁻) SR × Lac⁻ S^R
or (2061 + 1958) × 1607!

Reprint K.

L. (W1958 + W2061) × W1607 0/0) heavy sweep →
Test all 8 prototyphos in EMS lac. v. low yields.

M. (W2284F2 pool + W1958) W1958 recovered, + W1607 no prot.

Controls { W2061 × 1958
1958 × 1607 } no prototyphos
see infra no P⁺ in 2284F2

Lac X n.H24

6/9/53

A. H24⁵ forms s. c. sonEMβLac in Renassay

(TLB, -)

X B2 gave ca 50 prototrophs mostly Lac+

stats: H24⁵ ca 1% lacv.6/9/53 B. aerated in D(Lac, HC) { 1. x W1321 H⁻F⁻S⁺Lac⁻Gal⁻λ^sC. standing in " { 2. x W1486 F⁺ " "

yield

B1 no prot.

Viable: B 90% v. Rare +
C 70% v 1% +

B2 ++ → Replication no -

C1 ca 10 prot. Lac - Murein EMβLac. all Gal -

C2 + < Lac+ to EMβLac
Lac - to " GalThis stock therefore seems to behave as F⁻, especially when aerated.

Lac+ should be uniformly lacv.

C1. 3 Gal? 9 Gal - λ^s bestial 3.
plaqueation!

C2. Bestial possible Lacv or Galv.

	Lac	Gal
33	-	v?
34	✓	v+v?
35	✓	+v
36	✓	+v
37	✓	+v
38	✓	+v

(over)

	Lac	Gal		Lac	Gal	
1	v	-		17	v	v+v?
2	v	-		18	v	+v
3	v	-		19	v	+v
4	v	-		20	v	+v
5	v	v	H327	21	v	+v
6	v	v		22	v	+v
7	#	-		23		
8	v	+v		24		
9	v	+v		25		
10	v	+v		26		
11	v	+v		27		
12	v	+v		28		
13	v	+v		29		
14	v	+v		30		
15	v	+v		31	-	v+v?
16	v	+v		32	-	-

(over)

	Lac	Mal	Gal	Rev single col.	Lac	Mal	Methyl	Gal	MH	D10
1	v	-	-		v	-	v	v	v	+
2	v	-	-		v	-	v	v	v	+
3	-	(Mal?)	-	-	v	-	v	-	v	+
4	-	(Mal?)	v	-	v	-	v	-	v	+
5	-	+v	v	-	v	-	v	-	v	-

#3 is Lacv Gal-
(if p.c. heat+) -

+	v	-	v	v	v	v	v	v	v	+
v	-	v	v	v	v	v	v	v	v	+
v	-	v	v	v	v	v	v	v	v	+
v	-	v	v	v	v	v	v	v	v	+
v	-	v	v	v	v	v	v	v	v	+

fairly
middle?Assume 5 as significant. Save #3 as Lacv Malv Gal = Lp^v H326#5 may have been reinfected as feral Gal = Lp^s, or may be crossover.
(over)

Next requirements are

① Hexotyph rearrangement

② lp^s lp_r^s rearrangement. (perhaps better from a bal^+ revision ??)

③ bal^+ revisions (cis and trans)

④ bal^+ transductions ...

1

Most lacr from C2 are bal^+ mothls. H327

Retain #5 as bal^+ lacr and check other moths
also check "balr" from 1, 2, 17, 34.

H327: Lacr $balr$ Mal^+ s^s (S^S/S^R at lpo and lpr)
 lp_2^s lp^+ (lpo is lpo^R at lpo and lpr)

No immediately overt Q action: does this segregate lp^s ?

→ \exists other finds $lp^+/lp^-, \underline{lp_2^R}$.

? lp_2^s this must be ruled out.

no S^s with
heavy melanism
in EM pharao

C. 1-5: #1,4 are evidently Lac^r; may be useful later as Hfr 1F⁻
 #2,3,5 show peculiar mottling; is definite evidence of segregation.
 Could look for evidence of nutritional segregation. Store in NA stocks.

A	1	Lac	Mal	E1
Restatives	2	+	+	
of	3	+	+	
present	4	+v	+v	
s.c.i.	B 1	+v	+v	
from plating	2	v. light + v?	-	
on EM3lac	3	+v or v?	+v	E2
	4	+v	+v	
	5	+v and -	+	E3
to EM3lac.				presumably Lac ^r .

C	1	+v and -	+v	E4	have presumably been reisolated
	2	+v	+		
	3	+v	-		
	4	+v ?,-?	+ -?	E5	
	5	+v -?	-		
	6	+	-		
	7	+v	-		
	8	+v +?	-	E6	
	9	+v +,-	-		
	10	+v,+	- occ+		
	11	+v,-?	-		
	12	+	-		
	13	+	+		
	14	+,-v?	-		
	15	+,-	+		
	16	+v -	+	E7	
	17	+v -?	-		
				E8	

Remarkable mottled appearance of all of these. Save
 EM3 originals pure; choose for further study:

A1; B5; B3; C1; C16; C15; C8; E5.

Repick single colonies and spot EM3lac, brush EM3lac/suc;
 streak out EM3lac again. Handle as E1-8

check 56 & 2, 3 ✓

2 larv Melv Bal +
" " +
3 ✓ "

← -----

6/9/53

A. H310 (from 3.2. EM18lac to Penassay)

\times W1801 EM18lac Prod. lac - H: mostly lac_v.
 Pool plated on EMB lac, Mal. Ca 5% Mal-, 70% lac-. Mal_v possible lac, Mal_v for
 later pick. Plates may have been moist. growth very rough & spreading.

B. \times W1802 EM18lac. Prod. lac +

Pool: almost pure lac +

See 57E

yield very high. >> 1000/plate
 pool growth and methods
 for sampling.

C. H310 \times W2209 ($\lambda^{-}G^{-}F^{-}$) Dilute plating. >> 100/plate. Strains out
 weaker lac+ on EMB Mal. 24 tested: 16 Mal- 1+, - 7 Mal+
 Replicate \neq Mal+ which might be Mal_v. (2 from rare + among -; 2 Mal_v?).

Replicate to check lac poss.

	Mal	lac
1	+ v?	+ , + v?
2	+	+
3	+ and -	+ and -
4	+	+

Replicate streak plate (24 colo - C):

	lac	Mal	lac S
1	+	-	S
2	+ only	-	S
3	+ and -	-	
4	+	(+ colony lost)	R
5	V?	-	R
6	+	-	R
7	-	-	
8	+	+	
9	+	-	R
10	+	-	R
11	+	-	R
12	+	+	S

No Mal_v indicated.

	lac	Mal	S
13	+	-	
14	+	-	
15	+ o?	-	
16	+	-	
17	+	-	
18	+	-	R

Rederunk #1, 2, 5, 15, 24 on

EMB lac, Mal, Mtl; spot on Stac.

Renumber C1-C5.

More lac+
might be v.

C: Replicat: 20 streaked streak on Blac; have 12.

$= 6-17$

1	V	+ V	V
2	+ V	+ V	+ V
3	+ V	-	-
4	V	+ V	+ V
5	+ V	-	+ V

D H310 \times W1841. v. heavy yield. Numerous special lac+ TAC!

Replate H328:

7/8/53. all colonies prototrophic; including
<100 lact, fuscic-sugaryants
on two good plates.

SRP viruses in 1057E (J.L.)

Penassay (7.5 ml) cultures of the following were made and grown up overnight:

1817 57E 1, 2, 3, 4, 7
1177

Half a ml each of Pen 1057E and 1817 or 1177 were mixed in Penassay (7.5 ml), incubated 8 hrs, centrifuged, washed twice in centrifugate, resuspended in salt $\frac{1}{2}$ ~~water~~, plated on S lac sm 7/7/53

	X 1817	1177	control	S.O. on 3 lac
57E	lac+	lac-	-	lac+ (light + dark)
E-	lac+, few lac-	lac-, few lac+	-	lac+ (light + dark)
E+	lac+	lac-, few, against solid background	-	lac+, lac- (fewer, -)
E?	lac+	lac-	many cols, in lac-	↓
control	-	-	-	-

E? malleable; E1-E evidently ff. Test lac-segments.

6/16/53.

			MTP from argin	Mal (from trypt)	SM
x1801	1	+ (rough) only	+	+	S
x1802	2	+, sectioned or mottled +, and occasional	- (similar to H310)	+	S
x1802	3	"	v. rare -	-	S
x2209-4 = 1678	7	"	occ. -	+	S
H328 ← 5	-	"	, definitely sectioned +/-	+	R
6	app. pure +			-	R
7	+, s.m.,	occ. -		-	S
8	pure mottled +.			+	S
all prototrophies as EMS Lac					

dependence
of R/S.

#2,3 2n from H310; Mal, S from F-

4,7, 2n from H310; rid, S from F+

5 2n from H310, Mal S from H310 ($T^L +$ from F-)
X mutators; hemizygosity. H328.

Replicate each to 0/0 for nutritional segregation.

No auxotrophs noted & don't appear (very few segregants tested!)
Are these diploid or unstable Lac?? (H310 itself?)

5 Mal+ from H328. Streak on EMS Lac, Mal. of H328.

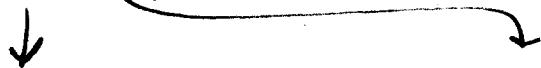
↓
All appear to be lac v Mal+ "(). Suggests H310 itself is
Mal-1.Attempts at H310⁺: plate on EMS Mal+ /oo hydrolyzed casein : ca 20 papillae
after 3-4 days, but these are not Mal+!Repeat - now smaller papillae: all Mal-! Reprod papillae
(var.)

Proof that H310 is diploid: Lac is only segregating marker!
(pure TLB, -!)

- a) Hfr 2n vs. F⁻ 1n.
- b) On a single occasion x 1895 gave Lac⁺ Mal⁺ Sv.
(cf. 1057.) H313

for test frags own papillae:

1057E1-2 papillae of H310 on EM5Mal HC.



Mal + Lac^r. same 1057E2 = Mal⁺ Lac^r

∴ Mal hemizygous

Reckeds ~~57E21~~ 57E21 as Hfr.

and segregants.

57E21 x W1607 → segregant of recombinants
parent controls = .

H290

1058

6/10/53

A. (aerated H290)

x { 1. W1394 }

nEMS lac

B unseeded "
(D(lac,M))

x { 2. W1918 }

yield

A1 6 colonies: 1 lac+ ; 1 lac+
2 10 " nolact+ ; 20 nolac+) R.
B1 2 -
2 nolac-+ ; 0.

1058A. Strainout A1 (1-5) B1 (6-9) nEMS lac

In repetition, none were lac, Mal V. T.O. for now

6/9/53.

H290 from 6/9/51: don't stretching
 (7/30/51) → to EMYlac. Grow
 in D/Lac HC...)

H302: SiO_2 tube 1 → grown slowly: pure lac-
 tube 2 → " ": invariable

lyophil → heavy uninhibited growth, ca 50% Lac v.
 → 90% Lac ✓

H313: susp. inviable

lyophil: (3/53 → found all segregated)
 6/53 → $\frac{\text{EMYB} \text{ Mal}}{\text{EMYS} \text{ Mal}}$ → mostly Mal-, Mal + Some V.

H226 ore. Lac v. fumigal 9/52 → ✓ (ss. (Lac+!))

H267 Almost all bar- " ". Reactions in EMYS Lac; back
 from EMYlac to D/Lac) →

318 Inviable

319 Viable; rare Lac+ (v. light, maybe v.)

9/3-14 ^{13}C pure Lac + 14. Reats.

H304-5 Mostly +, - T.O.

W1940 x 1956
Hfr F⁻

1059

6/11/53.

A EMS lac

B Are together in broth; plate EMS lac. ^{EM1956} ~~EM1956~~ [?]

A: 30 lac + from EMS lac to EM1956. Re-possible lac^v others are + (-). Restraints 10: all are Mal-, #14 lac^v? other bac, may rough!

B. Papillae eventually noted. Lysis instead?

Not scoreable for lac^v. Single + noted in each streak, probably successive.

None show bac segregation. Repeat exp.; also check for L.

59BB: Investigate lytic appearance in B:

59C 6/16/53 -x- EMS, EM1956 after growing together 6 hours separation. T.O. view of injury.

B3B: W1940 proved to be mixed Mal+ / Mal-

By plating of W1940 + W1956, Mal+ and Mal- lyt. are Σ gl+ = W1940
all bac-. Mal- normal are Σ gl- = W1956.

= W2302 isolate Mal- as presumed mutant of W1940 (This strain had been recovered from an old, dissected shot which grew out slowly). Recheck lyophil and current cultures of W1940. Reserve W1942 also for further experiments.

Remove W1940 stock from lyophil (pure Mal+) and throw out others.
(over)

D	W1956	X	W1940	EMBLac	} after growth, overnight
E	"	"		SLac	
F	"		W1942	BLac	
G	"	"		SLac	

Lac⁺ seen as papillae in strains of D, F.

ca 1% vle. + colonies in E, G.

Hold previous stains for later retest

7/4/53:

abandon in view of Cavalli's finding re Hf-Bal linkage

6/11/53

H324-5. Treat in D(Lac.) \pm UV, 20 sec. Broz. heavily in Penassay
scratches, and plate on EM13 lac. Replica to EM13 lac, NAD,
D/Lc) for discordances. ca 15 lac_v/plate : 5 plates

$$A = 11324 \text{ dm}^2$$

$$B = +1325.$$

few types of strokes:
 $\sqrt{V^+}$ not cutaneous

Isolated A 1 Gal-Mal-
 as possible: * 2 Aux.
 alt form 3 " "
 alt form 4 " "
 alt form 5 Gal-D ✓ H

Lac	³⁵ Gal	Hae	<u>Lp</u>	<u>Lp</u> ² (%)
2	-	-	-	-
1	v	v	-	-
	-	v	v	-
	v	v	-	-
	=	V _{MAX}	-	-

Updated on 07/13/00

stocks may segregate

B	1.	Mal-Gal+
	2	Aux
	3	"
	4	"
*	5	Mal -
*	6	Gal - ?
	7	"
	8	Aux
	9	Aux
	10	Mal - "
	11	Mal -
	12	Gal+Mal+
	13	Aux
	14	"
	15	

all are + or -.

S(f(x))

+

+

+

37 Repeat 1-2 kotsar
A1, 3, 5

(over) Try inferring
A.S.C.D

A5.c λ.

Also, pick pool and plate papillate bac⁺ which may not have registered in uprights. — most probably were represented add 2 possible discordances to above as A5; B15.

On initial restreaking A1, A5 gave light + Lacv. Transfer to EMBac plate and replicate for characterization. No out lysis in A1 strain; present in A5.

C. H326 $\delta\alpha^+$ reversion isolated from lac or $\delta\alpha$, streaked on EMBS $\delta\alpha$, lac. — to EML. Some typ. $\delta\alpha^+$ noted; others are slow+. For further study, streak out H326 on EMBS and obtain $\delta\alpha^+$ from separate $\delta\alpha$ colonies by replica to EML lac.

λ -tests on A1, 3, 5	λ
EMBLal	D(10)
1 R	
3 Mal ⁺ S MalR	
5 Mal ⁺ SandR? (lamin background) action	S!

S H332

\therefore presumably s/R
but Mal^{+/+}

H324. In EML tester segregation #1-7 appeared to be segregating Mal^{+/ -}, but #8-55 were all Mal⁺ (including many Xgl⁻). Forn. ex confirmed 6/17!

Check with T6: #1-10 ~~Mal~~^s were T6^s. H324 T6^s
~~Gal-~~
H325 T6^{s/R}

H324 as now available is Mal^{+/+}.

The bulk of EML's data must pertain to this "secondary".

Except for autoradiography, H332 is most suitable for infection of lp^s/lp^s Now need to obtain salt survivors.
H331 also OK; not segregating Mal

G1 H325. v. slow lac^r? — restrictive & test prototrophic $\lambda^- \lambda_2^R$ Gal⁻ Mal⁻

H H329A¹
2
3 Malv lac^r Galv lysogenic autotrophic

G1 might be Gal⁻ lac^r, but is apparently lys^R and presumably unsuitable for present purpose. H1-3 might be used by crossing to Gal⁺ lys^S. On the whole Gal⁻ (H326-331-332) seem technically most suitable. Check G1 by transduction to Gal⁺; if unacceptable, probably unusable.

→ H325 appears to be as given. (See 1062) Grow on D(Glu) ^{Don't bother}

6/15/53.

- A H302 grown in D(M, lac) \times Y10
- B " -) aerated, into D(M lac) 7 hours not aerated \times Y10
- C Aer. \times W1918
- D - not aer. \times W1918

Plate on EMS lac.

A. 2 plates No prototrophs

- (B 20-30 Lac⁺/plate 102 2 ?lac-/plate (H-302 paratypic)
- C 3-400 Lac⁺/plate 1-2 ?lac-/plate (H-302 orthotypic)
- D very heavy background 5-6 ? prototrophs/plate.

B. Strain 72 Lac⁺ in EMS lac for lacv.

C. Hold!

Pic to EMS lac. Not all grew out.

	Lac	Mal
1 V+	V	
2 V-	X	
3 V-	V	
4 V	V	
5 V	V	
38+6 +	+ +	
7 V	+	
45: 8 +	+ ?	
9 +	+V?	
10 V	V	
94: 11 +	+ +	
12 +	+	
13 +	?	
14 V?	V	
15 +V?	?+?	
16 +V?	V	
17 +V?	+V	
18 V	V	
19 V	V	
20 V	V	
21 +V	V	
22 +	+	
23 +	+	
24 V	V	
25 V?	V	
26 V?	-	

∴ in sum: 1' Mal

23 probable Lac v \swarrow \searrow ?

(not fully characterized)

33 Lac + < 1'

(16 were not prototrophic)

27-56 pic to EMS lac +

Lac+: 27, 28, 29, 30, 31 32 33 34 35 36

Mal+: - + + + + + + + + + + + + + +

Lac+ 37 + 39 40 +? 41-44 46-48

Mal+: + +, + + + + + + + + + + + + + +

(Lac ~~38~~? 38 V 45 V 54 V~~Mal ~~38~~ V V V~~

Lac+ 49-52 53, 55, 56

Mal-, + + +

Re-collect possible v and check with sum, etc.

Mal v usually scored on basis
of +, - being present.Elimination evidently does not occur in
renumber 38, 45, 54 as 6-8-112nF⁺ x ln F⁻

(include 1-23 are likely Lac v. (Malv). Re-examining the following)

	Lac _v	Mal → sm Mal	Mal sm Mal	Restrain entire series of 23.
1 ✓ VEG	+ ✓	+ - +S	+ S -S ✓	
2 ✓ AS	+ -	+ - +S -R	+ S ✓	EMB Lac, Mal
3 ✓ AD	- ✓	+ - +S -R	+ S -R ✓	Bush on EMB Mal
4 ✓	+ ✓	+ ✓ +S	+ S ✓	EMB Mal ✓ SM.
5 ✓ ID	- ✓	- ✓ -R	-R	
6 ✓ ID	+ ✓	+ ✓ +S	+ S	
7 ✓	- ✓	+ ✓ +S	+ S	
8 ✓	+ ✓	+ ✓ +S	+ S	
9 ✓ A	? ✓	+ - +S -R	+ S-R ✓	
10 ✓ A	? ✓	- ✓ -R	-R	
11 ✓	- ✓	- ✓ -R	+ S (-S) where	collected may have segregated.
12 ✓ A	+ ✓	+ ✓ +S	+ S	
13 ✓	+ ✓	+ ✓ +S	+ S-R ✓	
14 ✓ A	✓	+ ✓ +S +R ✓	+ S-R ✓	
15 ✓ A	+ ✓	+ ✓ ? +S -R	+ S-R ✓	
16 ✓ A	+ ✓	+ - +S -R	+ S-R ✓	
17 ✓	+ -	+ + +S	+ S ✓	
18 ✓ F	+ -	✓ ✓ -R	+ R -R ✓	+ S also present?
19 ✓	+ -	✓ ✓ +S +R	+ S -R ✓	
20 ✓ E	+ -	✓ ✓ +S +R	+ S -S ✓	
21 ✓ A	+ -	✓ ✓ +S -S	+ S -R ✓	
22 ✓ A	+ -	+ - +S -R	+ S -R ✓	
hap 23	+ ?	- - -R	-R ✓	

A). Lac v. Malv Sr Mtlv number : 2, 3, 10, 15, 16, 22

6

B) Lac v. Malv Sr Mtlv + " : 14, 19,

2

C) (Lac + Mal + Mtlv + S^s) : 4, 6, (7), 8, 9, (12), 17, 18

8

D) Lac +? Mal - Mtlv - S^R : 5?
-S 11, 22.

Dotted 2 Mtlv -
or Mtlv?

3

E) Lac +? Malv Mtlv + S^s? 1, 20 -

F) Lac v. Malv Mtlv - S^R 18

① Lac v. Mal - Mtlv + S^s

Recheck: ~~Mal~~ for Mtlv. ②

c): heptad: find diploid to D.

G) Lac .. Malv Mtlv S^s 21

1001C

	Lac	Lacm	Mal	Malsm	Mtl	D10	
H	1 ++	✓	+	-	-	-	
	2 +	✓	+	-	-	-	
	3 +	✓	+	-	-	-	
	4 +	✓	+	-	-	-	
	5 +	✓	+	-	-	-	
	6 +	✓	-	+	-	-	
	7 +	✓	-	+	-	-	
	8 +		+	-	-	-	
	9 +	✓	+	-	-	-	
	10 +		+	-	-	-	
<hr/>							
	11 +	✓	+	-	-	-	
	12 +	✓	+	-	-	-	
	13 ++	✓	+	-	-	-	
	14 +	✓	+	-	-	-	
	15 ++	✓	+	-	-	-	
	16 +	✓	+	-	-	-	
	17 +	✓	+	-	-	-	
	18 +		+	-	-	-	
	19 +	✓	+	-	-	-	
	20 +	✓	+	-	-	-	
	21 +	✓	+	-	-	-	
	22 +	✓	+	-	-	-	
	23 +	✓	+	-	-	-	
	24 +	✓	+	-	-	-	
	25 +	✓	+	-	-	-	
	26 +	✓	+	-	-	-	
	27 +	✓	-	-	-	-	
	28 +	++	+	-	-	-	
	29 ++	✓	+	-	-	-	
	30 +	✓	+	-	-	-	
	31 +	✓	+	-	-	-	
	32 +	✓	+	-	-	-	
	33 +	✓	+	-	-	-	
	34 +	✓	+	-	-	-	
	35 ++	+	+	-	-	-	
	36 ++	+	+	-	-	-	
	37 +	✓	+	-	-	-	
	38 +	✓	+	-	-	-	
	39 +	✓	+	-	-	-	
	40 =		-	-	-	-	

from EMS Mal
from EMS Lac

↓
ear shaded

Sym

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

all other S^R are Mal⁺
all "Mal⁺" are Mal^R

are probably
not prot parented H2O2.

not prot : 35 prototrophs
all evidently segregating

not prot ?
? R V V V V V V V

not prot R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

R R R R R R R R

most
with
one or
more +

six

7, 13, 19, 21, 22 are evidently Malv Malv S^R

25, 26, 32, 33, 34 may be (Malv + or Malv v) Malv S^R

37 is Malv Malv - S^R?

1, 15, 28, 29, 35, 36 may be lac hexloid.

Replate to EMS Lac
EMS Lacm to verify S^R pur.

Only exceptions for ✓ :

13, 15, 17, 21

106103B

Induction from notes

	Lac	Mal	Mal	S	S
1	.	v	+		
2	.	v	v	v	
3	.	v	v	v	s
4	+	v	v	v	s
5	v	v	v	v	s
6	v	v	v	v	ss
7	v	+	v	s	ss
8	.	v	+	s	ss
9	+	+	+	v	
10	.	v	v	v	
11	v	v	v	v	
12	.	v	+	s	
13	+	?	+	s	
14	.	v	+	v	
15	•	+	v	v	
16	.	v	v	v	
17	+	+	+	s	
18	v	v	-	v	
19	.	v	+	v	
20	.	v	+	s	
21	.	v	v	s	
22	v	v	v	v	
23	+	v	-	R	

haploid

haploid

haploid

Lac + mated!

Mal + S^r / Mal - S^s

haploid

some probably lac+

18 seemingly Mal-, Mal+ no Mal+ segregants. Rest were apparent

Mal+ for more material: 4 colonies gave same pattern.

Most Mal- are S^s Mal+ probably include some +.Summary: 56 prototrophs. 19 ultimately diploid (Lac+ or Lacv)

Most probably Lac+/- rather than +/-+.

Lacv Malv Malr S^r : 8 2 3 5 6 10 11 16 22

+ v	s : 4	1	8	12	20
+	+	s :	haploid only	(9, 13, 17, 23)	

v +	s : 1	7
-----	-------	---

v v	s : 2	4	21
-----	-------	---	----

+ v	v : 2	14	19
-----	-------	----	----

v +	v : 1	15	
-----	-------	----	--

- v	v : 1	18	
-----	-------	----	--

$2n "F^-" \times n F^+$

61cc

1/2/53

Recap. of types (provisional class. of 13, 15, 17, 27 as S^V).

A. 16 Lacv ($^{+/-}-$) MH-Mal-S^R : 2 3 4 5 6 9 11 12 16 20 23 24 29 30
31 38

B. 1 Lacv ($^{++/-}-$) ~~V~~ V : 13

C. 10 Lacv ($^{+/-}-$) V V V : 7 19 21 22 25 26 32 33 34/ 39

D. 1 " MH-Malv Sv : 37

E. 1 Lacv ($^{++/-}-$) Mal- MH- Sv : 15

F. 2 Lacv ($^{+/-}-$) Mal- MH- Sv : 17, 27
31

haploid: 5 1 28 35 36 40

anotn: 4 8 10 14 18

9

36 prototyphus tested. 31 diploid Lacv : 29 (app.) Lac $^{+/-}-$
2 Lac $^{++/-}-$
(may be incorrect).

Malv : 12

MHv : 11

Sv : 15.

#2 may be $^{++/-}-$ #3 $^{+/-}-$

Compare:

(Major types only, $\text{Mal}^+ - \text{s}$).

		B	C%
1	Malv	Sv	11 58
2	Mal-	SR	0 16 52
3	Mal+	Ss	1 5 0
4	Malv	Ss	6 32 0
5	Mal-S v	Sv	0 3 9+
6	Mal+	Sv	1 5 0
		19/49 +	31/56 part

$$B = 2nF^+ \times 410$$

$$C = 2nF^- \times 1918.$$



Differences: 1. 2n parent functions assume whether F^+ or F^- of $2nF^+ \times nF^-$ depended on polarity; reversal, there would at least be some Mal-SR . Split (B:C)(1:2) is certainly significant.

2. "No" $\text{Mal}^+ \text{S}^s$ in B, suggests that "none" of these diploids are hemizygous in this region. If elimination occurs from the F^+ side, it must involve only 1 of two strands, and the eliminated one may be discriminated against in zygote formation. It is possible that elimination does not occur at all from the F^+ side of 2n. Note high incidence of B4. (Mal/S) crossover!

3. High incidence of C2 suggests usual elimination from $1/nF^+$ side.
? are these homo- or hemi-zygous? Need tests on these and on C5.
Nearly half are S^v . Note: in B, only S^s and S^v ; in C only S^s, S^v .

61C hairy point test: (E75 Mal)

17: numerous Malt (pointy??)

2: 2 papillae

3: 5 papillae

15: 2 plates no Malt 7/10

2 plates: 3 Malt 7/18: → Malv.

{ → Malv.

#17 initially a few Malv. Resist Lacc Mal- and
(mutants?) ket

None of this is inconsistent with pre-elimination; if it occurs. Would need a Mal/s crossover ($Mal-s^>$) or a Mal -homozygote in B to substantiate it. Presumption of elimination is based on polarity differential.

Immediate arguments: hemizygosity tests in C¹, C⁵ classes.

Later: Look for Mal -debris in B. (Should occur by crossover).

\rightarrow βal^-

1062

6/19/53

A. NI-X H326 in EMB/βal

B. NI-X H331 " "

Several thousand eg. βal^+ from 1 log. Poland streak out as EMB/βal
background ca 4-5 papillae

check for lac v βal^+ : pick lac v to EMB/βal mostly lac v - but most βal^+ are
definitely variegated.

2 lac v bals screened from A, B. neg. Signs of lysis in eg. from
each. Further screening needed.

C. NI-X H325A (βal^- lac v) \rightarrow no βal^+ (λp_2^R ')

of EML

→ *S. abortus agui*
SW1058.

1062

6/16/53

A. SW1058 (mot.) in cow serum.

See 1042, 1052

Protein tube had not moved in 4 days.

6/16

1
2
3



7/9. All immobile! T.O.

B. FA18 →

6/17

1.
2.

C FA22 →

1.
2.

6/26. no swarms in any of above! (Try IV serum!)

6/26 SW1058 mot (fondant) = D and TM2 = E.

1. mot

2. IV

3. IV V XII (/ Typhlo)

4. IV XXVII XII

D 1 24h.
2 ++
3 +
4 ++ (definite inhibition)
 +++ stimulation? or
 fresher medium

E 1 24h.
2 +++
3 ++
4 +++ → still IV XII +++

Decom D2 after 48 hours. Streaked and test for trans., lysis etc.

more complete 7/1/53. / cow 2,3 FA18, FA22

6202 / cow 2FA22 no mot. 7/3/53 T.O.

7/2/53

Cross-stokes on EMS lac, i stock & as received from WBC.

B. & FA10 PB-1 PB-3a PB Taunton PB Dundee TM4 PRE

TM2 ++ - - - - ++ lytic

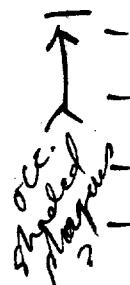
102DA (PB1) ++ ^{seen}
v. few plaques

SW730 - - - - - - (budding stroke)

SW887A1 - - - - - + notytic (nepoli stroke)

SW957 ± - - - - +? inh? (O901)

Breeding: 1024E1 - - - - -
3 - - - - -
4 - - - - -
5 - - - - -
6 - - - - -



titer?

shoulder
in PB1

Φ perhaps should first be grown to higher titer. Try TM4PRE / TM2
_{SW887}
_{SW957}

PB1 / PB1.

Try other Φ on nepoli, budding, etc.

Grow Taunton &, ~~PB2~~.

Test Φ pups → SW666

FA22 +
control -

TM / TM2
/ 887 -
/ 957 -

PB2 -
PB1 -
PB Taunton -

Φ maybe n.g.

Use PB2
PB BAOR
PB Dundee } as basic strokes. (over)

7/5/53

From results over,
Φ's have not been made to
adjustable titers.

Test loops full for 4 activity.

PB 4:

	1	4	7	10
2	5	8	11	
3	6	9	12	

B =
act.

PB1

PB2

666 (Jersey)

Taunton

For later study,

2

BAAK

Dundee

several types of phage.

	PB1	Taunton	SW666	Taunton PB2	TM2
1. 4PB1 (Ch.)	++	-	-	-	-
2. " "	++ ++	-	sic!	-	++
3. " Taunton	-	isol. pl.	±	-	sic.
4. " BAAK	-	-	-	-	-
5. " Dundee	+	fine plagues?	++ plagues	±? v. fine	
6. FA10	++	++	++	+ o.	++
7. 41/1 J.L.	+ isol pl	-	isol pl.	few pl.	
8. 42/2 J.L.	+ isol pl	-	isol pl.	-	
9. 4T/T J.L.	-	isol. pl.	isol. pl.	-	
10. Jersey (Ch.)	++	-	++	-	
11. 3a	++	-	-	-	
12. 3a1	++	-	-	-	
13. 3b	++	-	-	-	
14. Budeo	? fine pl.	-	+	fine pl.?	

18p

Ch. bugs??

It's not exposed to adequate titers.
In first preparation, PB2, 1B BAAK cleared; Dundee did not. Regrow Dundee
in 666, PB2 and Dundee

7/5-6/53

Chromophages.	Ch:	TM2	SW688	SW666	PB1	SW730	SW887	SW957
1.	-	-	-	-	+	-	-	++ ^{lytic}
3.	-	-	-	-	+	-	-	-
4.	-	+	-	-	-	-	-	pl. lytic.
5.	-	-	-	-	-	-	-	-
7.	±	dead	-	-	-	-	-	-
8.	-	-	+	-	+	+	+	±
9.	-	-	+	-	+	-	-	-
10.	++	-	-	-	++	-	-	-
(12)	++	-	-	-	+	+	-	lytic too
17.	-	-	+	-	-	-	-	-

From point of view of survivorship, #12 seems most likely.

Label on this vial reads: S. lucina #12. Cheng's letter

refers to S. lucina #18 as v. specific for group XI. Presumably not this #.

Grow #12 on TM2, SW887 to test transduction. Also grow
#1/957; 9/SW730; #4/957; #17/666, 957.

Need to find better hosts for 3, 7: try analogous strains (entombed,
stilbocyanin and gallicarium).

#1 seems to differ from 01 in host range. Called parA phage!

Stokes	Ch12 grown on TM.	spot: OK.	1 TM	v. small plaques
6/5.	on SW887	" "	✓	Titers not too high. but worth trying. On 01018; SW867 etc.
	on 730	**"		
	PB2	1/2 large + small plaques. Moderate #	/ PB1	
	B10R	✓ small plaques.		
	Bunkie	1 ✓ "	"	

Regrow for higher titer.

Ch Stokes spot: Taunton, B10R, Bunkie: not discernable /PB1.
May not have sources.

#7 SW764 (entirely) - +++ (lytic) and scattered survivors
 967 (dublin) -
 957 (0901) + (noncytolytic)

BAAOR PB1 + shaded
 666 ± shaded
 730 -
 887 ± shaded
 957 ± shaded.

Transfused. BAAOR → 666 → b, cat -
~~= 1063 AT~~ in 6 serum b: -

Repeat 7/8:
 BAAOR → 666 → b
 → 967 → (gm) +
 → H901 → -.

Repeat, looking for tracheas or plates → 666

(group: test ster. 7/764, 1/H901 ster.)
 (heated)
 7/8/53.
 PB1 - Leder-BAAOR (nw) 12/TM2, 887, P01
 4/H901 17/H901 } not sterile. but - 666 possibly trachea. ++
 ① melt off and test
 ② chloroform & and
 repeat.

7 → 666, 967, 957 all - in 24h. Titers?
 ch2 → 957 (ch2/TM2, 887, 730) all - in 48h.

- B1 (Ch12/P131 not stri. \rightarrow subsoil not) \rightarrow bal+ dormitory.
 B2 Ch12/TM2 " " "). \rightarrow bal+ contaminating bacteria in &
 B3 " 1887 " "

7/8. Repeated after CHCl_3 treatment \rightarrow 666, 957, 967 all -.

- A. BAOR \rightarrow SW666 / motility \rightarrow v. numerous swarms + trails
 B. = FA90 / EM/BDal \rightarrow ca. 100 bal+ / .1 ml
 Purify. controls: each 0, 0.

- (A) ① pool motile transductants (7730) all bal- .
 ② individual " " : all bal- . Pick to broth for
 sub. lysogenicity test.

- (B) 1. 20 streaked out: none motile, all pure bal+. Test pur. for
 lysogenicity, motility.

\therefore as before, no
 bal: H, Fl, vintage

- (C) FA90 \rightarrow SW950. / Gal same (ca 5-10 plate).
 ID (Meth) \pm FA. no evidence of transduction).

ch12/TM2 \rightarrow 666 }
 730 \rightarrow } =
 1887 \rightarrow

132 \rightarrow 666 -

Jordan \rightarrow 666 -

(over)

lysogenicity tests on 63 A-B.

A: 1-8 all are lysogenic on BAOR; sensitive to FA10;

SW666 not " " " ; " ;

SW928 " " " " ; resistant ;

all are resistant to FA90.

No control, BAOR / FA90. By 90 → SW666 these have evidently become lysogenic for BAOR indicator. In transduction platings, only rare plaques were seen. Save A1, B1 for further study.

B: 1-20 15 lysogenic on BAOR. Suggests that

BAOR might also be lysogenic. Many of these.

5 may be sensitive. As initial screenings a few were noted as possibly mixed lys./sens.

7/18/53. Lethal lysogeny etc...

	BAOR	PB2	sw666	FA90.
1063 A1	++ .	-	-	-
B1	++ .	-	-	-
sw666	- .	-	*-	- (shaded)
sw918	- .	-	+	-
BAOR	- .	-	-	+
PB2	- .	-	-	+

Note difference of 1063A1/PB2 and FA90/PB2. Suggests 63A1 may be lysogenic for a phage other than BAOR!!

v. small plaques in A1, B1.

BAOR lysogenic for 4 caused by
1063A1 =
63C1.

Strain out BAOR/90, PB2/90; and 63A + BAOR.

BAOR may be lysogenic for another phage which attacks PB2, G66..., but this is probably distinct from the lysogenizing phage in 63A-B.

On Breyendorf sw1060 (berry, 305-50) : 2025 str. on E74B Lac

	sw1060	PB1	After 48 hours, sw1060 swarmed in 1, 2, 3 serum → sw1060' /
Taunton (U. Str.)	-	-	
Beales (" ") 4 plaques		-	
Dundee / Dundee 11 plaques	ca 30		
Dundee / sw818	-	++	

Try to grow Dundee, Beales on sw1060.

63C1 FA90 → 63B1 /not
63C2 FA10 → 63B1 /not

Hold 63C1 for later lysogen. test

Tom's ?? Mal_v.

7/1/53...

TCN 174-95 for further study. From W1325 x W1394
Strain out 2 colonies from EMS lac. 1 → pure lac +, poor growth on Shc
2 → lac, Mal +, - and ? ↴

Restrain 4?

1, 2, 4: variable colony size on EMB lac; no -
3: Mostly lac -, Mal -. Occ. small +.

7/4. A. Restrain + colonies from 1, 2, 4 on EMB, EMS Mal / sm.

→ no signs of sensitivity in edges of many colonies look lysed
on EMS. If EMS is h. g. on EMS! (or lac?)
salt protection

Test parents, intact +, - for
sensitivity to "it".

B. Restrain 6 colonies from 3 (pres. + or v, not -).

all mother + on EMB lac → pure lac!

Restrain of 1-2-3-4 above: 1, 2, 4 and lac + 3 are S^R Mal +
lac - 3 = S^S Mal -

C. Tests for φ: using parents, 2+ 3- and 4+ as indicators, and
parents, mother + as sources: no signs of φ in cross-brush on EMS so

may be diploid or more likely, contaminated prototroph is pseudomutant.

Try Mal + prototrophs on EMB lac / sm.

mite p.v.

1065

7/8/53.

N97 s.c. to both

A1. — b plates (jars b, and numerata b)
B ~~UV~~ 30 sec (without cells)
C ~~B~~ Δ - 48 ~~min~~ 10 min.

Numerous swarms - more in B than A? - n b (jars, blinds)
None or b (numerata)

Note A4: b, 1,2 ++? Double per. test.

7/11/53. (UV - 40 sec.) Starbuck's results.

A ~~# swarms/plate~~ 8, 3, 15

B 2, 10, 2

C 1

Too variable for any clear result!

D:

after 48 hours, A and B
1 each
2 in bnum.

b + 1,2 ++? vs.c.

Incs 7/14 in 1,2.

~~7/19~~ " a few beginning to swarm, very maturely

A1, A4

D1 B2

C1 C2

D1 D2.

7/20. C1 {
D1 } \rightarrow magg.

Incs 7/19 in 1,2

7/26 Brief. No pupae swarm through 1,2 screens in all tests!

Seine essay for Sanger.

1066

6/18/53 W-1975, 1977 in 0/0 + glycine or saline
24 hours P17.

r/ml in 10 ml tubes

	1975	1977	
0	-	-	
L-serine 1	+	+	
5	++	++	
10	++	++	
100	+++	++++	+++ est 10^7
glycine 1	+	-	
10	++	-	
100	+++	-	(+++ est. ca 5×10^8)

confirms previous conclusion that W1977 is specific for serine.
In both cases, 100r serine showed early inhibition - serine toxic or impurity?

6/20/53. W1977

X.	10r	.
	10r	.
L-serine	40r	+
1r	.	.
10r	.	.
20r	.	.
100r	.	.

DL-serine 200r

- .005

100r (X)
50r (X)
10r (X)

serine 50r
L 10r

x in sol 2 mg/ml
10r/ml in 10 ml tube
 $\approx .05$ ml

Sanger's compound has about 10% activity of L-serine.

200r DL-serine = 100r L-serine.

Mixture of early growth at serine > 50r/ml.

Might be possible to select resistant mutant, not tried.

Occasional (ca 1%) tubes at low serine adjt.

Fall wild growth not achieved for either W1975 or W1977 with 100r serine, or 100r glycine. Mixtures not tried in this expt. Recrystallized L-serine used for these expts.

over

Suzuki later stated his compound was mostly aspartic acid! (Artistry for semesters?)
Asp decarboxylase?

Tay 2 monophagie ph 2

1067

7/17/53. SW1061 received from Edwards 7/16.

Both it and silent or bruske Tay^2 did not migrate in 1, 2, 3.
serum. $\approx 67A_1$

cf. also Tube-test "Tay 2" ph 1, 2 5/12/53., and Tay 2 ph i
 $\approx 67A_2$ $\approx 67A_3$

$67A_1$
 $67A_2$
 $\approx W1061$ } invisible in 1, 2 serum!
all 1, 2++ i-

Save SW1061 for future study.
Prepare FA 22/1061.

$67A_3 = \text{Tay}^2$: i++ 1, 2 -

$67A_3$: 1-4 (s.c.) all react 1, 2+++ i++ promptly!
in serum agrees $67A_3-1$ in i

But 1 \rightarrow 3 s.c. / m.NA together { all 1, 2+++
 i++
from NA with i- or ± b -
 1, 2++ b -

1061 in tube

1, 2 ++

$67B_1 = 22/8W1061 \rightarrow$ SW666. No ~~reaction~~ no b in tubes
though numerous swarms in plates and not in
tubes to be expected! $\therefore H_1? H_2? 1, 2?$ tubes.

In 1, 2 serum, A1, A2 and SW1061 are each invisible.
Tay 2 (A3..) passed readily through both i and 1, 2
 22×1061 also minor. $\xrightarrow{i++ 1, 2+++}$ $\xrightarrow{i++ 1, 2-}$
as before

7/18/53.

SW 1060 from Ehreny reported to be susceptible to PB phage
~~Bacillus~~ Bacillus, Tantors. In my hands, Dundee +.
~~Bacillus~~ ① in 1,2 serum → C phase. This was tested as follows:

FA10 (22B) — 1 pl?

FA90 —

FA18 (22A) + sparingly of plaques

Dundee +

Dundee/618 —

PLT7 +

68A 1 Dundee/1060c

2 Tantor, "

3 Bulle, "

↓ T-O.

no activity on 1060c.

This stock seems to be ~~susceptible~~ susceptible to PLT2 and PLT7 as well! Attempt to grow these phages on it.

Slide agglutination SW 1060 (from EMB agar, dilut.):

IV V X II	—
IX X II	+
VI VII	+++
VI VIII	++
II XII	—
II XIII ₂	—
IV XVIII XII	—

definite reactions with *S. paratyphi B*, *S. typhimurium*.

cf. other *bimangodoff* and *choleraesuis*.

C	—
I, S	—
P	+ gran
V	—

No occult lysis of PLT7/1060c; PLT2/1060c. "lysates" still active on T012 (camphor?). Try → SW 666.

7/20 68A1 7/... → 666) no motility

68A2 22/... → 666) SW 1060c itself partly motile: motility lost! → i (probably camphor) before proceeding

SW961 also reacted slightly with D serum, C, +
SW853, 732, 737 reacted poorly with both in first test.
853 also showed plaques (?) vs. P7, P22.

T.O. and start fresh after summer.

68B.

in C, (smutti) or C (H) serum as indicated

7/21 - 7/26. Antif motility not checked. Bacterial check
in C, (.01 ml or .02 ml/tube), about same.

7/26:

1. SW1060C 1c \rightarrow 15
2. " x PA22 1c \rightarrow 15
3. SW1060C 1c,
4. " x PA22
5. SW1060 1c,
6. " 1c, 2x
7. " ~~x~~ " "
8. " ~~x~~ " "

Vi + Typhi ~~x~~

1069

M182. 4 → 0901

9-10/53. See 1071.

ca 9/10. Motility SW759, 760 through plates of semisolid.

After 2-3 passages, both cultures were entirely ~~not~~ mobile ~~and~~
but reacted Vi + d-, except for an original SW760 which was
Vi -. Passage strains of SW759/42 tested x in
semisolid tubes ± d antiserum.

A. 1 no serum +++ in 24-48 hours.

2 d " 2 tubes complete inhibition.

3 FA10-x, " NO outgrowth

4 PA22-x, " "

described after two weeks.

B. Use A1 as medium. - found not very motile.

Repeat passages.

10/15. C. Various det't phage from Anderson, rather low titr. Test x SW957
in tubes : (820, 63, 81, d4, d6, 25¹, 28¹, 26¹, 30¹, f2¹) all
negative. Re-transfer to fresh tubes for recheck.
29¹ swarmed. Repeat test.

However, "control" PA22, FA85 gave no swarms : formed a few plaques?
Re-check, 28¹ and 820 swarmed in second tube but not
the 1st. Appearance of multiple sites of initiation??

Try other
members + Vi.

Afr - Gal.

1070

Hfr - Wg 28.

7/27/53.

W1895 x W1321 in Petri dish, then streaked on EMB lacsm, EMB dhal 22m.
5 plates each.

controls ok.

1 full lac+ (full gal+ (ca 1% ext. of all lac+ SR)).

Restriction EMBS dhalson. Heldas 1070 A1, A2 - to HLR to test.
(should be M-) Hfr .. 2

H _B =3	x 1177	control
1070A ₁	800-1,000 cts/HF	-
1070A ₂	"	-
control	-	-

10/6/53 W1895 + W2333-8 in broth overnight. streak on
EMB lacsm: All showed lac+ SR ca 1-3%.

W 2333
~~2334~~
2335
2336
2338

Use 2333 for furtherrypt.

2337 gave few or none mutant streak slow.

R-X SW666

1071

22-X ...

September 5, 1953.

A. SW957-X

B. SW666.

1. Control
2. FA22
3. R (endure strike)
4. φ's.
5. FA85.
- 6.

Plates

Tubes.

A 1

2 no sw on plate

3 ✓ numerous. all d.

no sw.

no sw !!

1+, 1-

B 1

2 ✓ numerous -

3 ✓ ~~some~~ 3 spores.
~~some~~ streaks
see trailer.

3: 2nd (not hyperactive)
1st (not 51 R)
Bal-

✓

no sw

2- sw

1+, 1-

4 k

✓ streak

422

✓ streak

5. 5-6 swarms ca 100 streaks. Pcts and isolate & name = 71A5.

∴ R functions as transducing phage. FA22 appears to have lost titer in part. Use 71A5 for X-galactosidase in & serum. (cf. H901)

1071A6. 957/k (not motility). Tested and ✓ resistant to FA51, k.

9/9/53. R-X ... sw:

no motility agar

1 plate each

C.	1	550	-
	2	1063	-
	3	1064	=
	4	1066	=
	5	1067	=
	6	1068	=
	7	71A6	numerous T+S.
	8	1072	+ → 1, 2++ i++ (2++ (5+) + !! (mom.)

D1	FA51 (01)	→ 71A6	-
2.	53A	" "	1 sw?
3.	53	" "	2 sw
4		"	

swarms: significance?

Note reactivity is ⑤ as well as ②.

Note ⑥ = S. Berlin/S. para B. XRx may be related to ③.

September 15, 1953.

58-161 from stock (MLM) streakout. Pick one colony = 1072-01 (ETM blue)

8/14/53. Restreak 01 for reisolated, single ~~the~~ clones.

8/15/53. Save samples; inoculate motility tubes and plates.

A. P19. N20 AB ¹⁻¹⁰ ¹¹⁻²⁰

8/18.

1	+++
2	+
3	++
4	+++
5	+
6	+
7	++
8	+
9	+++
10	+++

11	+++
12	++
13	+++
14	++
15	+
16	+++
17	++
18	±
19	++
20	++

✓
+++
+++
✓
+
+++
+++
-
-

-
-
++
++
++
+++
++
++
+++
++

B.

+++
aggregately
n.t.

P23+++
++

++ to +++
isolate.

→ streak out ++.

+++ = nearly complete
or through tube.

Remove ~~*~~ to fresh plates.
all to 5P18.

Hold tubes add. day.

P23: A10 only immotile culture. Remove from top.

Streak plates to 10/5. Pick single colonies at A, B.

not (motility and aftergrowth of second motility solution) for compatibility
against tests. Note sectoral mucoids at ~~the~~ 16, 19 A-B, 20B (some A)
and ~~the~~ H~~A~~ 11, 17, 18 B. Relationship to schizias? Retracts variegated colonies
from 19B. Note noticed in section A.

10/8. Test large loops of concentrated mixtures

in W1177, W1876 and 848ac.

compatibility testing

10/10. Most x ~~W1177~~ overgrown! check this parent!

W1177

(Contaminated ??)

x W1876 predominant factor -

1	X	
2	X	
3	X	-
4	+	+
5	++	ca = sic
6	++	+
7	X	-
8	X	-
9	X	- few +
10	X	- "
11	++?	-
12	++	- sic.
13	X	-
14	++	+
15	X	
16	X	
17	++	+
18	++	+
19	X	- few +
20	++	+
W1607	++	all -

78A1 X
note ratios might
be distorted
by growth.

X confluent
all x 1177 are X.

Repeat 11/1/53. (test - B)

	W1177 heavy backg.	W1876
A1	+	+
B1B	?	+
2	45?	+
3	-	+
4	-	++
5	-	+++
6	-	++
7	+	+
8	-	++
9	-	+++
10	-	+++
W1607	-	++
	-	-

of 1-10, 1, 2, 7 may be F+ still. Rebuke 3.

Some plates may
have been too heavy.
unless off!

5, 12 should be rechecked after
compatibility is confirmed.

11/7

58-161 stocks streaked out. Individual colonies = 72A (1-20) grown out in motility tubes (1-10) or plates (11-20). Mass inoculum for second passage. Also streak out these inocula and save S.C.I. = 72B (1-20) A. Streak out second passages and S.C. = 72B⁽¹⁰⁾B⁻, for F test.
Test on 1-10 by JT (ulogrown separately, washed and plated D(0))
11-20 by TCN (grown together, plated on EM5tae Th 519; 00 Th 521).

Results on BxB series: All F- except 1, 2, 6, 7, 14, 15.

14 may be fission type (cf. W 2206 = 1022 (3)). Showed up by reduced motility in F+ as well as ~~compatibility~~. Few prototrophs are rechecked at 14 Sac: 1: 1+/2 2 1+/5 6 1+, 7. 3+/.. and therefore likely bona fide. Should be rechecked, and further selected.

Sus-A should also be reviewed.

A. FA80-x H901 not.

B .. -x 71A6 not. /d

see 1043.

A: 4/5. 9/18. → all gm +.

B: ditto

Previous failure may be attributed to insufficient notability of the H901 used.

B control: ~~not mot.~~ a/19.

A control → j+++ pr-gm- A4: may be mixture of j, gm.

A5: j++ pr++ gm? d?

B5: gm++ pr+++ j- d-

purified A0: j+++ d-gm-. = SW1097

rx: pr+++ j++ gm±

A1: s.c. = SW1097
6/6 gm± j+ !
(gm or j or X?)

A4: s.c. 4/4 gm± j+

But note: A1 reacts + w/ pr.
AO -
in comp test
J. SW 1041

Region FA85/SW775
84/SW77485A }
85B } *S. pullorum*

0901 not or S.

further.
→ 0901. 3T; 1S.

further.

2T

Traces too short

to isolate for selected higher transmission.

later studies in fresh dilution of gm serum (1/60 of 1:5000)

from broth SW1041, 1097 gm++ pr++ j-

" 1096 gm- pr± j++

10/10/53.

A. Test SW1028 = ^{orig.} N97b → S. marin, b:1,5 in b,5 serum for occurrence of 1,2 phase. 1: stock culture 2: motility passage

B. SW^{1043 FA 86b}~~1051~~(~~1055~~) → SW874 (Luria Binda) / a, env [for b(12): env] 1/4 migrated → b (w/o growth). # ylate - still env
 1 } stock culture 3/4 migrated → b (w/o growth). # ylate - still env
 2 }
 3 }
 4 }
 nos s.c.i. / b; env
 vb v up → env see orig.

C. SW803 ^{FA 15} env (atmig²) → ~~N97~~ original / b; 1,2 for (b:12) env

6/6 feces migrated in 24h. 10/11 PM streakout.

all env: nos s.c.i. in env, benv

(poss. contamination
 atmig in phage? Der PA 15B study.) → all b.

(cf. SW426
 1051-
 1055)

P11. Purify B1-3 C1-6.

A17. A1. → 1, ... → s.c.i. 1²++ 5++ 2- 1,5++. Probably had gone 1,10
 12 atmig. yet

C2,3. slow buds. Others still almost stationary.
 mid, env

B, C / b, env.

10/16 - C3 b+? z_{33} +? 1,2 - env - somewhat rough.

C4 stellarx+, b-~~++~~, 1,2 -

These were enlarging buds,
not flowers.

medium s.c.i.

10/17
swam to bottom

B3

C1

atest single clav isolate:

10/19 C3 : b. z_{33} ? + 1,2 - env - Semitextile.

C4 : env+ b; 1,2; env -

C4 : env+.

B3 : rough. b?

1074

A) 97b → main → b; 1,5 / b,5 → o ✓

B) SW1043 → ^{s.} _{a: env} ~~laminar~~ ~~bindg~~ → b → env ✓

C) abnorm → N97b → env → b ~~✓~~ _{b: env} → o.
 ~~not no, 2~~
~~(tighten)~~

first env of env → H, H₂ ^{1,2 env} is still H₂?

ca 10/10/53

Note: 10/3: pullorum was tried extensively on SW1040/a and failed.
Other pullorum FA should be tested → 957 for highest activity.

✓ → 957

- A. Test n.g. 3/4 owing to overgrown container. All others gave numerous plaques. Also swarms in P2, 9, 12. P2 probably most active. (Test each on 1/2 shell plate)
- ✗ B. P, G1 → ^{long lysis} 874 / a, env no swarms. Test 2-3 and 1-6 any how 10/18: still env
- ✗ C. P, G1 → ^{extreme} 770 / chg; 1,5 2 each. No swarm.
- 1? D P, G1 → SW967 (dublin 0) G1: few long plaques, no swarm. P1 ^{singly} ~~plaques~~!
- ✗ E P, G1 → SW989 (TM 0) no T or S in either
- ✗ F P, G1 → SW991 (dublin i) / i 2 each
- ✗ G. P2 → SW1004 (Salmonella) / a, 1,5 ca 10/14. } 3 each 10/19.
- ✗ H. G1 → " " " " } no swarms 10/19.
- J P2 → SW1040 / a No swarms 10/19. Hold to...

C, F poor registration, rough. C still 1,5... F still ...

K ① SW1028 / b + 5. → slow bud: b - 1,2 ++ 1,5 ++
 ② (methylated)
 v. slow bud until 10/19. 2 - 5 ++

1,10??

(next transp → 5++ again)

S.typhi seemingly only receptor for phage from gallinarum. Results of pullorum equivocally negative.

X. not finished.